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DESCRIPTIONS OF TWO NEW SPECIES OF *EUSCHOENGASTIA* (ACARINA: TROMBICULIDAE) FROM CALIFORNIA AND BAJA CALIFORNIA NORTE, MEXICO

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Abstract: Two new species of *Euschoengastia* are described: *E. hardyorum* n. sp., off *Dipodomys microps* from Death Valley National Monument, 4 mi E Wildrose Ranger Station, Inyo Co. California, and *E. marginalis* n. sp., off *Neotoma lepida* from Lower Covington Flat in Joshua Tree National Monument, Riverside Co. California. Included is information on host-chigger relationships, ecology, seasonal occurrence, and distribution of both species.

Concentrated studies of North American *Euschoengastia* have revealed two new species which are described below. One has been taken only from heteromyid rodents in Inyo County, California, and is similar to *E. romola*, described by Brennan and Jones (Wasmann J. Biol., 12:155–194, 1954) from Monterey County, California. The second resembles several other western species of *Euschoengastia* and usually was found on *Neotoma lepida* from northern Baja California del Norte, Mexico, northward into Inyo County, California. Both species were initially described in an unpublished masters thesis submitted to California State University, Long Beach, by R. E. Somerby entitled "Chiggers of the Genus *Euschoengastia* (Acarina, Trombiculidae) from Southern California," ix + 141 pp., June 1966, and are reinterpreted here.

The holotype and one paratype of each species will be deposited in the collection of the Rocky Mountain Laboratory, Hamilton, Montana. Additional paratypes will be deposited in appropriate collections; other paratypes and specimens examined are in the chigger research collection at California State University, Long Beach, California.

The descriptions of the new species are based upon the holotype, paratypes, and other specimens examined. All measurements are in microns. Under specimens examined, the enumeration in parentheses following a host name or collection date refers to the number of larvae examined; the second enumeration following the slash refers to the number of hosts examined: (7) or (17/2).

***Euschoengastia hardyorum*, new species**

Figure 1

Types: Larvae, holotype and 48 paratypes from Death Valley National Monument, 4 mi E Wildrose Ranger Station, Inyo Co. California; holotype and two paratypes from *Dipodomys microps*, original number RBL621105-12, collected by Ross Hardy on 2 November 1962 (R. B. Loomis, cataloger); 38 paratypes from nine *Dipodomys microps* (RBL621105-3,-4,-5,-6, -7,-8,-10,-11,-13); and eight paratypes from two *Perognathus formosus* (RBL621105-1,-2), same locality, date, and collector as above.

Diagnosis: ALs < PLs; palpotibial claw pentafurcate; 2 genualae I, without subterminala I, parasubterminala I, genuala III and tibiala III; all dorsal body setae with large conspicuous ventrolateral setules and shorter dorsal setules.

Description of holotype (unless otherwise noted, averages and extremes of 11 paratypes in paren-

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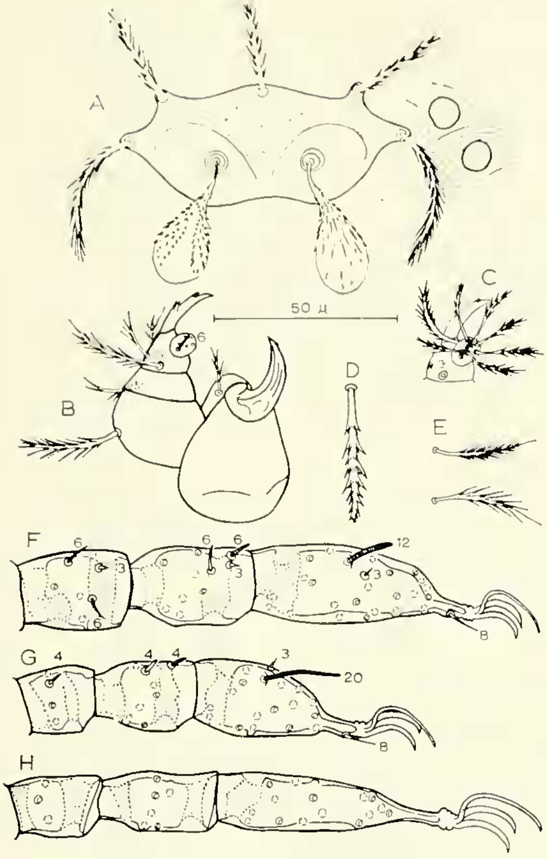

Figure 1. *Euschoengastia hardyorum*, new species: A, scutum; B, ventral aspect of gnathosoma; C, ventral aspect of palpal tibia and tarsus; D, posterodorsal body seta; E, leg setae, typical of distal segments; F, distal segments of leg I with bases of branched and specialized setae (measurements in microns); G, leg II, as above; H, leg III, as above.

theses): Body, engorged, length 416, width 285, color in life white. Eyes 2/2, without ocular plate. Dorsal setae 2-10-10-2-8-6-2, total 40; measurements of humeral seta 39 (40.7, 38–43); anterodorsal 36; posterodorsal 30; shafts of setae in last three rows slightly flattened and expanded; all dorsal setae with large conspicuous ventrolateral setules and smaller dorsal setules. Ventral setae 2–2+34, total 38; measurements of first sternal seta 36; preanal 23; posteroventral 29.

Scutum.—With flared anterolateral and posterolateral margins, SBs posterior to PLs, prominent ridges anterior to SBs, few scattered inconspicuous puncta; sensilla clavate, anterior surface with long, slender setules becoming sparser distally, posterior aspect with short, blunt setules and a bare median strip becoming wider distally, pedicel with barbs on distal third. Scutal measurements of holotype: AW, 52 (50.8, 48–58); PW, 70 (71.9, 66–81); SB, 26 (26.3, 24–31); ASB, 20 (19.9, 19–21); PSB, 12 (16.6, 9–13); AP, 16 (14.1, 12–16); AM, 27 (25.6, 24–27, eight paratypes); AL, 28 (29.1, 27–32); PL, 37 (42.4, 41–45); SL, 36 (34, 32–36, eight paratypes); SW, 14 (14.6, 13–16, nine paratypes).

Gnathosoma.—Galeala with four branches (3 to 4-branched). Palpal formula B/B/BBB; palpotibial claw pentafurcate; lateral palpotibial seta with three branches (2 to 3-branched). Cheliceral bases without puncta.

Legs.—Subterminala I, parasubterminala I, genuala III and tibiala III absent; tarsi of legs I, II, and III with 23, 16, and 15 setae, respectively. Leg index of holotype: I, 244; II, 206; III, 241; total, 691. Mean and range of selected nude setae of 11 paratypes: tarsala I, 12.9, 12–14; tarsala II, 19.9, 19–21; proximal tibiala I, 7, 6–9; distal tibiala I, 7, 6–9; proximal tibiala II, 4.5, 4–5; distal tibiala II, 4.8, 4–6; dorsal genuala I, 6.3, 5–9; posteroventral genuala I, 6.4, 6–9; genuala III, 4.6, 4–6. Coxae and other leg segments not punctate.

Specimens examined (74 larvae): CALIFORNIA. *Inyo Co*: Death Valley National Monument, 4 mi E Wildrose Ranger Station (5710 ft), 2 November 1962, 10 *Dipodomys microps* (41), two *Perognathus formosus* (8); 5 mi E Wildrose Ranger Station, 8 September 1962, *P. formosus* (3); Argus Mts., Homewood Canyon, Ruth Mine (3860 ft), 8 November 1964, *Thomomys umbrinus* (1), *Dipodomys merriami* (3), three *P. formosus* (18).

Taxonomic remarks: Euschoengastia hardyorum is similar to *E. romola* Brennan and Jones in lacking subterminala I, genuala III and tibiala III, and in overall size. It differs from *E. romola* in having a pentafurcate palpotibial claw, the posterior two or three rows of dorsal body setae are slightly expanded, and all dorsal body setae have large conspicuous ventrolateral setules (*E. romola* has a trifurcate palpotibial claw, all dorsal body setae, except the medial-most of the first posthumeral row, are flattened and appear leaf-like, with small ventrolateral setules similar to the dorsal setules).

Euschoengastia hardyorum is named for Ross Hardy and his son, Alan Hardy, formerly of California State University, Long Beach, in recognition for their many contributions of mammals which were examined for ectoparasites.

Ecological notes: The type locality in Wildrose Valley was on an alluvial fan which extended from the mouth of Upper Wildrose Canyon. The area was covered by a desert pavement of coarse gravel between larger rocks. The most common plant was blackbrush, *Coleogyne ramosissima* Torrey. The whitish-colored larvae were in pits on the venter (belly, legs, and genital area) of heteromyid rodents trapped in early September and early November.

Euschoengastia marginalis, new species
Figure 2

Types: Larvae, holotype and 15 paratypes from Joshua Tree National Monument, Lower Covington Flat, Riverside Co, California, collected 19 February 1961 by Dennis G. Rainey; holotype and seven paratypes from *Neotoma lepida*, original number KDP610314-7 (K. D. Peyton, cataloger); seven paratypes from *Perognathus fallax* (KDP610314-6); and one paratype from *Dipodomys merriami* (KDP610314-8).

Diagnosis: ALs and PLs subequal, sensillary head capitate, pedicel distinct; palpotibial claw trifurcate, lateral palpotibial seta nude (sometimes with 1 or 2 small branches); microgenuala I and microtibiala I dagger-like (short, thick), subterminala I and parasubterminala I present, tibiala III absent; all dorsal body setae with long, conspicuous ventrolateral setules and shorter dorsal setules.

Description of holotype (differences in specimens from throughout the range noted in parentheses): Body, slightly engorged, length 264, width 175, color in life orange. Eyes 2/2, without ocular plate. Dorsal setae 2-12-12-9-8-6-6, total 55, with long, conspicuous ventrolateral setules and shorter dorsal setules; first and second posthumeral rows usually with 12 setae (of 53: 3 percent with 10, 15 percent with 11, 69 percent with 12, 12 percent with 13, 2 percent with 14); measurements of humeral seta 42; anterodorsal 42, posterodorsal 38. Ventral setae 2–2+57, total 61; measurements of first sternal seta 43; preanal 23, posteroventral 30.

Scutum.—With few, conspicuous puncta, bases SBs slightly posterior to bases PLs, prominent ridges anterior to SBs; sensillae capitate, posterodistal median area bare, pedicel distinct; scutal setae densely covered with setules. Scutal measurements of holotype followed by measurements of specimens from throughout the range (mean, range, and sample size): AW, 53 (52, 45–59, 52); PW, 72 (73.4, 66–79, 57); SB, 15 (19.7, 15–28, 59); ASB, 29 (27.6, 18–30, 58); PSB, 14 (15.4, 11–20, 58); AP, 21 (21.5, 18–26, 59); AM, 30 (31.2, 27–35, 48); AL, 45 (43, 38–51, 56); PL, 43 (43.6, 39–48, 57); SL, 29 (30.6, 27–35, 24); SW, 18 (19.1, 17–21, 44).

Gnathosoma.—Galeala branched. Palpal formula B B BNB; palpotibial claw trifurcate; lateral palpotibial seta nude (of 30 from Joshua Tree National Monument: 77 percent nude, 23 percent forked to 3-branched). Cheliceral bases and palpal coxa with few, inconspicuous puncta.

Legs.—Tarsi of legs I, II, and III with 22, 16, and 15 setae, respectively. Leg index of holotype: I, 265; II, 223; III, 245; total, 733. Measurements and positions of nude setae as in figure 2. Mean, range, and sample size of selected setae of specimens from throughout the range: subterminala I, 16.9, 15–21, 55; parasubterminala I, 10.6, 9–12, 39; tarsala I, 15.9, 14–19, 57; tarsala II, 19.8, 17–21, 57; proximal tibiala I, 11.9, 10–16, 56; distal tibiala I, 10.9, 9–14, 56; proximal tibiala II, 6.9, 6–11, 57; distal tibiala II, 7, 5–12, 56; dorsal genuala I, 9.9, 7–16, 50; posteroventral genuala I, 11.2, 9–18, 47; genuala II, 5.5, 5–7, 57; genuala III, 5.4, 5–9, 52. Coxae conspicuously punctate; other leg segments with few, inconspicuous puncta.

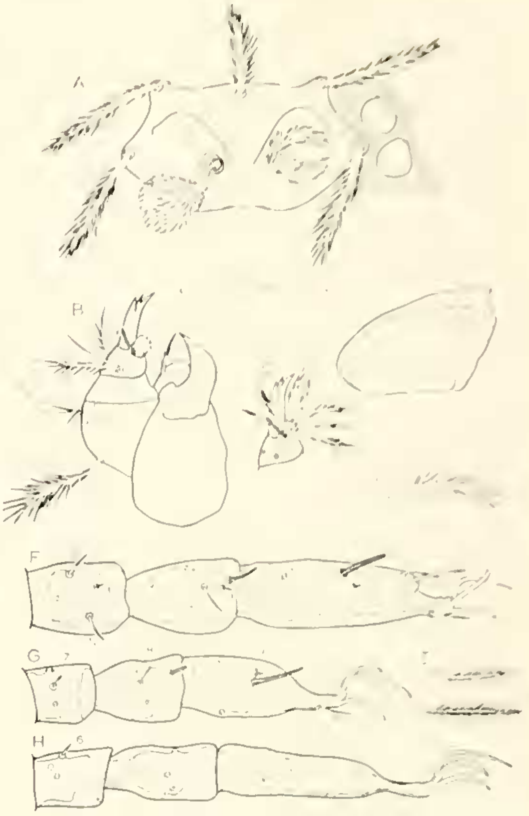

Figure 2. Euschoengastia marginalis, new species: A, scutum; B, ventral aspect of gnathosoma; C, ventral aspect of palpal tibia and tarsus; D, coxa III; E, anterodorsal body seta; F, distal segments of leg I; G, leg II, as above; H, leg III, as above; I, leg setae, typical of distal segments.

Specimens examined (645 larvae): MEXICO. *Baja California Norte*: 4 mi S El Topo, 29 December 1962, two *Neotoma fuscipes* (12), *Neotoma lepida* (7), *Perognathus californicus* (2). CALIFORNIA. *Inyo Co*: Death Valley National Monument, Eagle Borax Works ruins, 21 December 1962, *Peromyscus eremicus* (1). *San Diego Co*: 5 mi E, 5 mi S Pine Valley, 5 November 1961, *N. fuscipes* (20). *Kern Co*: 10 mi NNW Mohave, 3 November 1968, *Dipodomys panamintinus* (1). *San Bernardino Co*: 8 mi S

Barstow, 26 January 1963, *Neotoma lepida* (8); 12 mi S Needles, 6 February 1965, three *N. lepida* (6); 1.2 mi N Yucca Valley, 23 November 1963, three *N. lepida* (20); 1.5 mi W Yucca Valley, 8 November 1963, *N. lepida* (3); the following from Joshua Tree National Monument; Long Cyn. (4.8 mi N of south boundary of Monument), 17 March–28 April 1963, *P. eremicus* (1), three *N. lepida* (7); Indian Cove (3000–3500 ft), three *N. lepida*, 22 January 1961 (10), 4 March 1962 (2), 26 November 1967 (5), two *P. eremicus*, 22 January 1961 (1), 26 November 1967 (2); Lower Covington Flat (4200–4700 ft), 16 *N. lepida*, 29 November 1959 (17/2), 22 February 1960 (79/6), 22 January 1961 (76/5), 10 February 1962 (7/2), 16 December 1963 (7), *Perognathus fallax*, 22 February 1960 (4). *Riverside Co*: all from Joshua Tree National Monument: 2.2–3.5 mi S Cottonwood Spring, three *N. lepida*, 23 January 1961 (1), 28 January 1962 (22/2); 1.7 mi SSW Cottonwood Spring, 5 February 1967, two *N. lepida* (3), three *P. fallax* (10); Long Cyn., 16–17 February 1963, three *N. lepida* (20), 2–16 March 1963, two *N. lepida* (14), *Dipodomys merriami* (1), two *P. fallax* (5); Lost Horse Valley, 29 December 1961, two *N. lepida* (20), 9–10 February 1962, four *N. lepida* (18), *Peromyscus truei* (1), 21 December 1963, *N. lepida* (8), *P. fallax* (1); Lower Covington Flat, six *N. lepida*, 29 November 1959 (14), 20 March 1960 (16), 19 February 1961 (16), 20 October 1962 (9), 16 December 1963 (15/2), *D. merriami*, 19 February 1961 (1), *P. fallax*, 19 February 1961 (7); Upper Covington Flat, 28 November 1959, *N. fuscipes* (1); 2 mi NW Old Dale Junction, 9 December 1962, *N. fuscipes* (4); Pinyon Wells, 18 March 1962, two *N. lepida* (10); Squaw Tank, 11 *N. lepida*, 28 December 1961 (44/4), 9 February 1962 (17/3), 24 February 1963 (20/3), 8 December 1963 (6), *D. merriami*, 9 February 1962 (8), *P. fallax*, 9 February 1962 (1); Stubby Springs, two *P. fallax*, 4 April 1969 (8), 30 March 1969 (4); White Tank, 25 February 1961, six *N. lepida* (29), *D. merriami* (1).

Taxonomic remarks: Euschoengastia marginalis is similar to *E. ambocalis* Wrenn and Loomis (J. Med. Ent., 10:97–100, 1973), *E. fasolla* (Gr. Basin Nat., 15:1–26, 1956), and *E. radfordi* Brennan and Jones (1954) in having the AL and PL setae subequal and capitate sensillae with distinct pedicels. It differs from *E. ambocalis* in having long, conspicuous ventrolateral setules on all dorsal body setae and a nude lateral palpotibial seta (setules subequal and a branched palpotibial seta in *E. ambocalis*); from *E. fasolla* by the presence of a subterminala I and a parasubterminala I (absent in *E. fasolla*); and from *E. radfordi* in having a dagger-shaped microgenuala I and microtibiala I, and inconspicuous puncta on the cheliceral bases and distal leg segments (needle-shaped and strongly punctate in *E. radfordi*). The average lengths of certain nude leg setae of larvae from San Diego County and Baja California del Norte were slightly longer (up to 5 microns) than those of specimens from Riverside and San Bernardino counties; for example, posteroventral genuala I, 16 versus 10.3, and proximal tibiala I, 13.7 versus 11.6. The populations were similar in other respects.

Ecological notes: Larvae were recorded from 101 individual hosts; 74 were *Neotoma lepida*; the other 27 hosts included three species of cricetids and four of heteromyids which usually were taken from the same trap lines as *N. lepida*. Known localities for *E. marginalis* are generally habitats at the margins of deserts and the dry coast. The orange-colored larvae were found deep in the external auditory meatus of hosts from mid-October through April; however, the highest incidence extended from November through March.

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